MT MESSENGER BYPASS PROJECT: SUMMARY OF EVIDENCE OF NICHOLAS JAMES DRYSDALE SINGERS (VEGETATION AND OFFSET AREA CALCULATIONS) FOR THE NZ TRANSPORT AGENCY

1. As explained in my EIC, I have prepared a range of technical reports on vegetation effects. These have in turn been used (by me) to calculate an offset for vegetation loss. I have also contributed to the ELMP.

2. I have visited the site on over 30 days from January to October 2017, including in-depth assessments of five potential route options. For this reason I can place information provided for the Project footprint into the context of the surrounding area.

Vegetation

3. Potential Ecosystem classification system was used as a framework for descriptions of ecosystem diversity and loss.

4. The Project will result in the loss of 31.676ha of indigenous forest and secondary scrub. This figure does not include areas of pasture or rushland vegetation communities (farmland) dominated by exotic plant species.

5. It is important to recognise that 17.891ha of the 31.676ha is within the Additional Works Area. For the purposes of the consent application it is assumed this will be cleared. This scenario is, however, not expected to occur due to a combination of more refined mapping of, for example, access roads, and constraints included in the vegetation removal section of the ELMP.

6. Four Ecosystem types are affected along with many vegetation communities, which hierarchically sit within these. The areas of highest ecological value are forest dominated by kahikatea forest in the Mimi and Mangapepeke catchments (WF8) and tawa, rewarewa and kamahi forest in the Mimi catchment (WF13).

7. In much of the Mangapepeke catchment, vegetation is of comparatively lower ecological value, having been subjected to vegetation clearance from agricultural development on private land and severe browsing by introduced livestock and pests, especially possums, cattle, goats and pigs over the entire catchment.

8. On valley floors prone to flooding the Kahikatea, pukatea ecosystem type occurs — approximately 2.629ha of habitat is affected which equates to approximately 0.59% of the remaining habitat in the Ecological District.

9. This ecosystem is nationally threatened with <2% remaining nationally. It is better represented in the North Taranaki Ecological District with approximately 7.6%

remaining. For this reason I will summarise the loss of these communities in greater depth.

10. Within the WF8 ecosystem type, area of loss includes approximately 0.684ha of forest including:

10.1 In the lower Mimi valley, 0.159ha of kahikatea, swamp maire forest occurs. This small stand is of high ecological value, especially because it contains swamp maire.

10.2 In the Mangapepeke Valley, 0.525ha of relatively young pole kahikatea forest occurs in four separate areas. All stands are grazed and have limited understorey vegetation. Of this forest area about 0.2ha, may be avoided through further fine-scale design changes – highlighted in the ELMP.

10.3 The remaining valley floor vegetation communities are all in the Mangapepeke Valley and are 'treeland' = 'trees in rushland' or scrub. These are open stands of either kahikatea, moribund small pukatea and tree ferns or manuka. All of these have a ground cover tier dominated by exotic and native rushes, localised sedges and introduced pasture species.

11. Most hill-country forest (19.738ha), from the mid-Mangapepeke Stream south conforms to the WF13: Tawa, kohekohe, rewarewa, hinau, podocarp ecosystem type. North of this hard beech appears and which is classified as WF14: Kamahi, tawa, podocarp, hard beech forest (8.909ha) but most of this is secondary forest communities.

12. In comparison the loss of vegetation within these ecosystems amounts to approximately 0.11% and 0.09% of the total area remaining in the ecological district.

13. There is also a minor area of steep cliff habitat of approximately 0.399ha (CL6) which is mostly scattered manuka.

14. Classified structurally the Project will result in the loss of up to 23.867ha of native forest, 1.363ha of mixed native and exotic treeland, and 6.445ha secondary native dominant scrub — most of this is significant as defined by the District Plan.

15. The Project will result in the loss of a small number of an At –risk threatened plant, kohurangi (*Brachyglottis* kirkii) and 28 swamp maire which in the last month was classified as being threatened due to myrtle rust invasion.

Mitigation and Biodiversity offset calculations

16. The overall unmitigated effect of the Project on vegetation is significant because of the scale of vegetation loss, its composition, structure (being older complex forest ecosystems), ecosystem rarity and because some effects are permanent.

17. Mr MacGibbon summarises the Restoration Package in depth, however I provide a summary for vegetation and how this relates to the offset calculations.

18. The Pest Management Area was chosen to be 'like for like'. All ecosystems and most vegetation communities present in the Project footprint occur in the PMA.

19. It is 3650ha in size. A core area was determined as being approximately 900ha of this total area, where all pests, specifically including feral ungulates would, be below target levels in three years, resulting in habitat which is 'healthy and functional'. This is the area of habitat included within the Biodiversity Offset Calculation.

20. The core area includes approximately 27ha of valley floor kahikatea, pukatea type communities, 704.5 hill-country tawa podocarp type forest and 171.9 of tawa, hard beech type forest.

21. The Biodiversity Accounting Model (the Model), developed for the Department of Conservation by Maseyk et al. (2014) has been used as a 'decision support tool' to assist in informing the amount of biodiversity offset required.

22. More specifically, the Model has been applied to calculate what level of offset is required to achieve 'No Net Loss' of vegetation biodiversity values within 10 to 15 years.

23. All aspects have been applied in a precautionary or conservative manner. This conservatism is described fully in my EIC – point 172(a)–(f).

24. The Model calculated that:

    (a) Using integrated pest management in 'like for like' habitat, an area of 230 ha is required to offset the loss of vegetation communities of WF8, WF13 and WF14 ecosystems types, within an identified target area in the Mimi catchment — No net loss by Year 10 and Net gain by Year 15.

    (b) To offset the loss of kahikatea trees a further 6 ha of restoration planting is proposed (noting that kahikatea trees would not benefit substantially from pest control).

25. The Model was also run for the larger 900ha core area over a 10 year period, using identical values for improvements in ecological integrity for comparison.

26. The updated PMA at Year 10 predicts the biodiversity gains to be significant for the core area of 900ha.

27. The Model uses a currency called 'Net Present Biodiversity Value' to compare losses and gains.

28. The impact of the Project was calculated as negative 25.81 NPBV.

29. By comparison, at Year 10 the offset calculated NPBV was positive 39.36. This strongly suggests that there will be a significant 'net biodiversity gain' for vegetation, from 900ha of integrated pest management intended to achieve high ecological integrity.

30. This Project directly trades off 'area of habitat' for an 'improvement in condition'. Measured in these terms the Project will result in a potential maximum loss of 31.676ha and area of improved condition of 900ha. Comparing these statistics, for every hectare lost, 28 hectares will be managed toward 'high ecological integrity'.

31. Benefits to biodiversity are however expected to be greater than solely the benefits within the 900ha core area.

32. In almost the entire 3650ha PMA, I expect possum browsed tree canopies of species such as northern rata, thin-barked totara, tawa and kamahi to improve in condition. This should reduce mortality of these trees. These improvements in forest health will flow through the wider ecosystem by providing a greater amount of resources from flowers and fruit for native wildlife.

33. I also expect that that the PMA will also benefit the Parininihi kokako protection area, essentially becoming a large goat and possum control buffer. Goats have been continuously managed at Parininihi for over two decades some areas such as the western part is now goat free. My expectation is that goats will be eradicated throughout the eastern side of Parininihi leading to better conservation outcomes than without the Mt Messenger PMA.

34. This is likely to result in the recovery of browse sensitive species, including threatened plants like King fern.

35. For these reasons it is my opinion that the mitigation and offset package will result in significant positive benefits for vegetation and flora within the wider Mt Messenger – Parininihi Area, with a 10 year time-frame.